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GREAT VALLEY PRODUCTS INC.

SCSI Hard Disk Drive Controller

User's Guide

- A2000 - 2/X
- A2000 - HC+2/XX
- A2000 - 8/X
- A500 - HD/XX
- A500 - 2/X

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1. Introduction.

The Great Valley Products (GVP) IMPACT product line offers a wide range of high performance add-on peripheral products for the Commodore Amiga computer systems. This booklet serves as the User Guide and Installation manual for the following products in the IMPACT product line:

- **IMPACT A2000-2/X.** A Combination AUTOBOOT SCSI controller and optionally installed 2MB FAST RAM for the Amiga A2000. The "X" suffix denotes the amount of FAST RAM (in MB) actually installed at the factory.
- **IMPACT A2000-HC/XX.** An AUTOBOOT SCSI controller board for the Amiga A2000 which allows a 3.5" Hard Disk Drive to be mounted directly (flush) on the controller board itself. This is the "HardDisk-on-a-Card" product (sometimes referred to as a "HardCard"). The "XX" suffix denotes the formatted capacity of the hard disk directly mounted on the controller board, at the factory.
- **IMPACT A2000-HC + 2/XX.** An AUTOBOOT SCSI controller for the Amiga A2000 which allows a 3.5" Hard Disk to be mounted flush on the controller board itself, and it can also support 2 MB of FAST RAM.
- **IMPACT A2000-8/X.** An AUTOBOOT SCSI controller for the Amiga A2000 with a maximum populated memory of 8 megabytes. This board also can be configured with 0, 2, 4, 6, or 8 megabytes of FAST RAM using convenient SIMMs.
- **IMPACT A500-HD/XX.** A Hard Disk and SCSI controller add-on subsystem for the Amiga A500. This sub-system also allows an optional internal FAST RAM expansion of two or four megabytes to be added using convenient SIMMs. The "XX" suffix denotes the formatted capacity of the hard disk installed internally in the subsystem.
- **IMPACT A500-2/X.** The optional AUTOBOOT/FAST RAM expansion module which can be installed in the earlier IMPACT A500-HD/XX product. This provides up to 2MB of FAST RAM expansion as well as the AUTOBOOT capability for users who have purchased Impact A500-HD/XX units prior to 1990. Owners also have to upgrade their A500 kickstart ROM to V1.3 or later to use the autoboot feature. The "X" suffix denotes the amount of FAST RAM (0 or 2MB) actually installed at the factory.
- **IMPACT ADVANCED AUTOBOOT SUPPORT SOFTWARE.** This optional set of replacement autoboot ROMs and diskette greatly extend the capabilities of the IMPACT SCSI controllers to include support for removable

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- **IMPACT ADVANCED AUTOBOOT SUPPORT SOFTWARE.** This optional set of replacement autoboot ROMs and diskette greatly extend the capabilities of the IMPACT SCSI controllers to include support for removable

media drives like the GVP SQ44 cartridge hard disk system and the GVP WT-150 streaming tape backup system.

A key feature of all the GVP IMPACT SCSI controller products is their AUTOBOOT capability. This feature together with the Commodore V1.3 or later Kickstart ROM will allow the Amiga A500/A2000 to be booted directly from the hard disk WITHOUT the need for a workbench floppy disk.

The FAST RAM capability (on all the GVP IMPACT products that have this) provides a zero wait-state, FAST RAM expansion. When installed, the FAST RAM is automatically AUTO-CONFIGured into the AmigaDOS available memory list.

All the IMPACT products covered in this manual provide the same high performance SCSI (Small Computer Systems Interface) controller function. In this capacity the GVP IMPACT controller functions as a high performance "SCSI Host Adapter". The high performance is achieved through the use of an onboard dedicated STATIC RAM buffer which allows fast DMA (Direct Memory Access) data transfers between this buffer and any SCSI peripherals. This means that the GVP IMPACT boards never take over the Amiga system, nor interfere with any Amiga video or other DMA activity. Up to SEVEN SCSI peripherals can be supported by these products. Each peripheral connected on the SCSI bus must have its own unique SCSI ID number allowing it to be uniquely recognized and selected by the SCSI controller hardware and software. If two SCSI peripherals are connected which have the same SCSI ID, then contention will occur and the system will not function at all. So BE CAREFUL to select the correct SCSI ID when attaching multiple SCSI peripherals.

All the GVP IMPACT SCSI Controllers provide two separate SCSI connectors, namely the 50-pin internal SCSI connector and the 25-pin external SCSI connector. Each one of these is intended for a different purpose. The internal 50-pin connector (near the middle of the board on the HC's or near the back of the other SCSI RAM controllers) is intended for connecting SCSI peripherals which are mounted internally in the A2000 case or A500 add-on subsystem case, e.g: an internally mounted hard disk drive. The external 25-pin "D" connector is intended for connecting external SCSI peripherals, which have their own power supply and case. This external connector is electrically compatible with the Macintosh Plus and can use Mac compatible cabling and peripherals.

In order to use a hard disk, a SCSI interface must be connected to the GVP IMPACT SCSI controller. In the case of the A2000-HC/XX and the A500-HD/XX, this is generally done at the factory (unless the "XX" suffix is shown as "0"). The controller then acts as the "link" between the SCSI hard disk drive and the Amiga Computer system. Great Valley Products supplies hard disks in various sizes for this purpose. We recommend that you purchase your hard disk from us as it allows you to

benefit from a single supplier warranty which offers obvious advantages if any problems should occur during the first year of usage of our products.

The following Hard Disk Drives have been specifically tested to work with the IMPACT SCSI RAM controller. Note that all hard disk capacities are shown in FORMATTED capacity (i.e. the size of the hard disk which can be used by AmigaDOS).

- Conner Peripherals CP340 (3.5", 40MB) and CP3100 (3.5", 100MB)
- Miniscribe 8425S (3.5", 20MB) and 8051S (3.5", 40/43MB depending on revision).
- Rodime 652B (3.5", 20MB), 3057S (3.5", 45MB) and 3085S (3.5", 70MB).
- Seagate ST251N (5.25", 40MB), ST277N (5.25", 62MB), ST296N (5.25", 80MB)
- Seagate ST125N (3.5", 20MB), ST138N (3.5", 30MB), ST157N (3.5", 46MB) and ST1096N (3.5", 100MB)
- Quantum Prodrive 40S (3.5", 40MB), Prodrive 80S (3.5", 80MB), Prodrive 105S (3.5", 102MB).

Note: All of the above Hard Disk Drives, EXCEPT the Miniscribe 8425S and Rodime 652B, have an AUTO-PARK feature which automatically parks the Read/Write heads in a special shipping zone when power is turned off. A special utility is provided on the GVP Hard Disk Installation diskette which allows the heads to be parked before the drive is moved. This utility is called "GVpparkHD" and can be found in the "gvpscripts" directory. Type in the following line to park the first hard drive "sys:gvpscripts/gvpparkhd 0" or use the SCSI ID number of the drive you want to park instead of the "0".

WARNING:

IF YOU ARE USING A DRIVE WHICH DOES NOT HAVE THE AUTOPARK FEATURE IT IS ESSENTIAL THAT THE "GVpparkHD" UTILITY BE RUN BEFORE THE HARD DISK IS MOVED OR SHIPPED IN ANY WAY WHATSOEVER.

The rest of this guide explains in detail how to install the different GVP IMPACT Controllers and internally mounted hard disk drive (where applicable).

WARNING:

NEVER switch off or reboot your Amiga computer immediately after hard disk activity has occurred. Wait at least 30 seconds AFTER the last command has completed before switching off or rebooting your Amiga. The reason for this is the AmigaDOS

operating system may still be updating critical data structures on the hard disk, from its own internal buffers, even after it appears that all commands have been completed. This AmigaDOS requirement is also the same reason why floppy disks should never be ejected before the red light goes off on the floppy disk drive, even though all commands may appear to have been completed. This is an inherent constraint of AmigaDOS and is the same for any hard drive and controller combination.

IF THIS WARNING IS NOT ADHERED TO, ALL DATA AND FILES ON THE HARD DISK MAY BE LOST!! In some cases it will be necessary to reformat and re-initialize the hard disk causing a loss of all data. This is an inherent AmigaDOS problem and is not caused by the GVP IMPACT SCSI controller.

2. Installing the IMPACT A2000-HC/XX and HC + 2/XX into the A2000

This chapter describes the physical installation of the IMPACT A2000-HC series into your Amiga A2000 system. The IMPACT A2000-HC series is the "Hard Disk On a Card" (sometimes referred to as a "Hard-Card") product.

The diagram below shows the layout of the main components on the IMPACT A2000-HC/XX SCSI controller board.

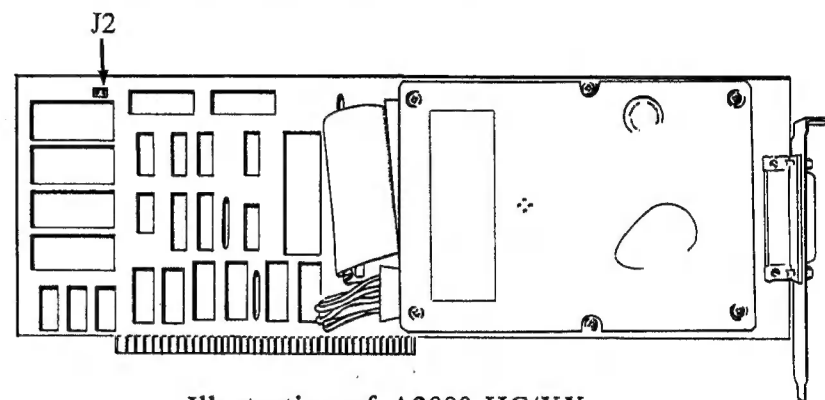


Illustration of A2000-HC/XX

The diagram below shows the layout of the main components and RAM modules on the IMPACT A2000-HC + 2/XX SCSI RAM controller board.

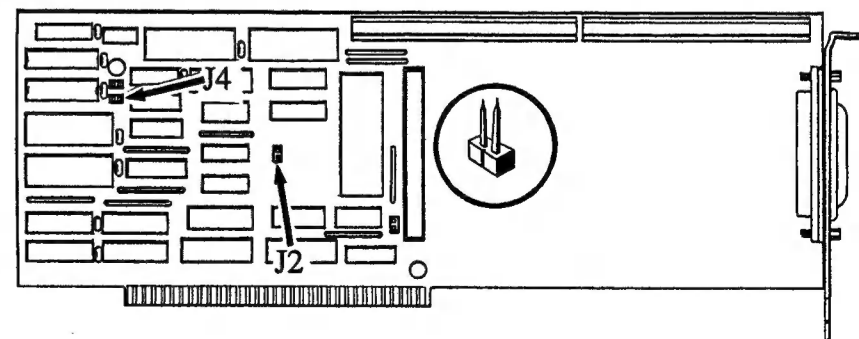


Illustration of HC + 2 A2000-HC/XX

WARNING:

Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the hard disk to any shock or other hazard during installation.

The IMPACT A2000-HC series controller cards are generally shipped with a hard disk drive already mounted on the controller card. This factory mounting of the hard disk itself takes care of the following:

- SCSI ID of the Hard Disk Drive has been set to ZERO.
- The SCSI bus terminating resistor packs have been removed from the hard disk drive. This means that terminating resistors MUST be installed on the last SCSI peripheral installed if additional SCSI devices are attached to the IMPACT A2000-HC SCSI controller. See the chapter on "Installing additional SCSI devices".
- A special LED cable has been installed on the hard disk drive which can be used to operate the "Hard Disk" LED (green light) on the front panel of your A2000.
- A short 50-pin ribbon cable has been installed to connect the hard disk drive to the SCSI bus of the IMPACT A2000-HC series controller board.
- The power connector on the IMPACT A2000-HC series board has been connected to the hard disk drive. This means that the drive will draw power directly from the IMPACT controller board itself. No other connections are required to supply power to the hard disk drive.

The following is for the IMPACT A2000-HC + 2/XX only

The memory should be installed on the board before the controller and drive are installed in the Amiga 2000. The IMPACT A2000-HC + 2/XX uses industry standard 1 Meg by 8 SIMMs of 150ns or faster. Both SIMMs must be in the sockets for the full two megabytes of memory. One megabyte is not supported. Place the SIMMs in the sockets so the RAM chips on the SIMMs are facing the drive. Remove jumper J2 to activate the memory and have it autoconfigure.

The remainder of this chapter assumes that all the above have been done, i.e. you have purchased an IMPACT A2000-HC series card with a factory installed hard disk drive. The following simple steps should now be followed to install your IMPACT A2000-HC series card into your A2000 system.

WARNING:

Unplug the Amiga A2000 before removing its top cover to install the IMPACT A2000-HC/XX. Installing any card with the power on could cause possible injury to yourself and damage the equipment. Great Valley Products will not be responsible for any damages caused by improper installation of the IMPACT A2000-HC boards. Such improper installation will void all warranties both on the A2000 itself and on the IMPACT A2000 expansion boards.

Step 1: Disconnect the power cord and any peripheral cables from the back of the Amiga A2000.

All cables or other objects attached to the back of the Amiga A2000 should be disconnected. Make a note on exactly how everything was connected so that you will be able to reconnect these cables when you have completed the installation.

Step 2: Disconnect the mouse and the keyboard (and any other cables) from the front of the Amiga A2000.

Again make a note of exactly what gets connected to what so that you can reconnect it when you have completed the installation.

Step 3: Remove the five screws which hold the Amiga A2000's top cover and remove top cover.

There are two screws at the bottom of each side of the Amiga A2000 and one screw on the back which hold the top cover in place. The screw at the back is positioned dead center at the top. Put the five screws and washers aside so that they won't get lost! Gently slide the Amiga's case forward (towards the front of the Amiga), then lift it off and place it somewhere close at hand. Be careful in removing the top cover, make sure no wires are caught under the metal tab to which the center screw in the back was attached.

Step 4: If the two GVP AUTOBOOT EPROMS are installed on the IMPACT A2000-HC board and your A2000 still has the V1.2 Kickstart ROM, then the AUTOBOOT Jumper J2 (see diagram at the beginning of this chapter) must be removed, as no AUTOBOOTing is possible with the V1.2 kickstart ROM. On the A2000-HC + 2, the jumper to remove would be J4 in-

stead of J2 since J2 is the memory configuration jumper on the HC + 2.

Step 5: The IMPACT A2000-HC series board can be installed in any one of the five 100-pin Amiga expansion slots. However, it should preferably be installed in the end slot closest to the power supply, so that only a single expansion slot is used as the hard disk drive will hang over unused space inside the Amiga A2000. Decide which slot you want to use and remove the screw above the blank at the back of the computer.

Note: Keep the screw as it will be used to secure the IMPACT A2000-HC board at a later stage.

Step 6: Install the IMPACT A2000-HC series "Hard Disk on a Card" in the slot you selected. Be careful to ensure that the front of the controller board slides correctly in the plastic guide attached to the inside of the front of the Amiga A2000 case. Apply slight pressure to push the controller board firmly into the slot (connector) on the Amiga A2000 motherboard. Make sure it goes all the way down and that the metal bracket connected to the rear of the IMPACT A2000-HC series controller board correctly sits on the ledge at the back of the A2000 case.

Step 7: Using the screw that held down the blank metal bracket (from step 5 above), fasten the rear bracket of the IMPACT A2000-HC series controller board to the Amiga A2000 case.

Step 8: Next the Amiga A2000 "Hard Disk" LED (green light on A2000 front panel) must be connected. This LED will show when the hard disk drive is being accessed by the A2000.

Look inside the A2000 case and track down the wires coming from the "Hard Disk" LED on the front panel. You will notice a 3 pin connector on the end of this cable (which should not be connected to anything). Route the wire in a neat way and connect this wire to the twisted red and black cable which is supplied by GVP at the factory. Make sure that you connect the A2000 LED wire connector in such a way that the two pins with wires (one pin has no wire connected to it) match up with the two pins of the hard disk drive LED connector. NOTE also that the two wires of each cable (i.e. the A2000 LED cable and the Hard Disk LED cable) are color coded. It is essential that the two cables be matched RED-RED and BLACK-BLACK.

Switching the red and black wires will not damage any of the equipment, but the drive LED will not light if the wires are reversed.

Step 9: Replace the top cover on your Amiga A2000 and re-install the five screws to hold it securely in place. Reconnect all the peripherals and then reconnect the power cord.

You have now completed the hardware installation of your IMPACT A2000-HC board and now you are ready to initialize the hard disk and start the software installation. Proceed to the chapter dealing with "Software Installation".

WARNING:

Your AMIGA 2000 system should NEVER be shipped WITH the IMPACT A2000-HC board and drive installed. Before shipping your A2000 system anywhere (e.g. by mail, UPS or FEDEX, etc.) ALWAYS REMOVE THE IMPACT A2000-HC controller. The reason for this is that the single metal mounting bracket on the IMPACT A2000-HC board will not be strong enough to hold the IMPACT A2000-HC board and drive in place during the typical manhandling which will occur during shipping (e.g. the unit could be dropped on its side or even upside down). Serious damage can occur to both the A2000 motherboard as well as the hard disk if this advice is not followed.

3. Installing the IMPACT A500-HD/XX on the A500.

This chapter describes the physical installation of the IMPACT A500-HD/XX on the Amiga A500.

WARNING:

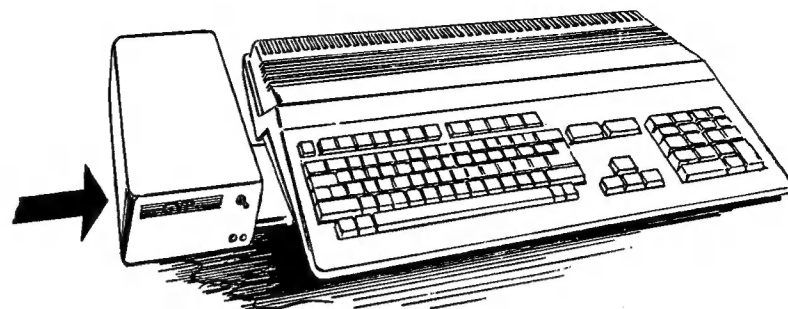
The IMPACT A500-HD/XX has a built-in hard disk drive. Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the A500-HD/XX unit to any shock or other hazard during installation.

Installing the IMPACT A500-HD/XX is as follows:

NOTE: Unplug the Amiga A500 before installing the IMPACT A500-SCSI/RAM controller and hard disk. Installing the Hard Disk with the power on could cause damage both to the A500 and the IMPACT A500-HD/XX. Great Valley Products will not be responsible for any damages caused by improper installation of the IMPACT A500-HD/XX subsystem. Such improper installation will void all warranties both on the A500 itself and on the IMPACT A500-HD/XX subsystem.

Step 1: The A500-HD/XX subsystem plugs directly into the Amiga expansion connector located on the lower left hand side of the A500. This expansion connector (on the A500) is covered with a protective plastic cover (about 5.5" long). This cover must first be removed from the A500 case so that the A500 motherboard expansion connector is exposed. The IMPACT A500-HD/XX subsystem can then be directly plugged onto this connector.

Make sure the connector on the IMPACT A500-HD/XX subsystem is pushed all the way into the mating connector on the A500 motherboard. **THIS IS VERY IMPORTANT.** Once connected, the A500 and the IMPACT A500-HD/XX system should NOT be moved as a single unit. If you must move the system, disconnect the A500 from the IMPACT A500-HD/XX unit, move them separately and reconnect them when you have decided on a final workplace.



Step 2: The IMPACT A500-HD/XX uses a dedicated power supply which is included with the unit. Connect the round plug of the power supply to the power connector at the back of the A500-HD/XX.

Step 3: Now connect the AC power cords of BOTH THE A500 AND THE IMPACT A500-HD/XX power supplies to a multi-outlet POWER STRIP WITH AN ON/OFF POWER SWITCH. These type of power strips are easily obtained at your local Radio Shack or Sears store. It is recommended to use this method of powering the A500 and the IMPACT A500-HD/XX system as this allows both units to be switched on and off simultaneously with a single power switch. The ON/OFF switch on the multi-outlet power strip will therefore act as the ONLY on/off switch needed for the complete system as a whole (you could also plug you monitor into the same power strip). When using this method, the ON/OFF power switches on the A500 and the IMPACT A500-HD/XX power supplies must be permanently left in the ON position, so that the ON/OFF switch on the multi-outlet power strip effectively becomes the only ON/OFF power switch.

Current versions of the A500-HD/xx are supplied with a Game Switch. This switch will allow you to disable the AUTOBOOT ROMs for some of the older programs that will not work with autobooting or for testing out programs that might cause data loss on the hard drive.

Assuming that you have the Kickstart 1.3 ROM installed in your Amiga 500, you can switch between an autobooting system or one without the hard disk. When the switch is in the up or on position, the computer will start running from and using the hard disk drive. In the down or off position, the hard disk is not normally accessible. You must reboot (CTRL-A-A) the system immediately after changing the Game Switch. If you do

not reboot the system, you will soon get a software error message and have to reboot under less controlled circumstances.

NOTE: Once the hard disk has been installed and initialized with the installation diskette included with this module, it has already been prepared for AUTOBOOTing, and it is ready as soon as the A500 motherboard is upgraded to the V1.3 Kickstart ROM. This V1.3 Kickstart ROM is available from Commodore through your local Commodore-Amiga dealer. Once your A500 motherboard has been upgraded with the V1.3 Kickstart ROM, all that needs to be done to activate the AUTOBOOTing feature is to re-install the GAME SWITCH connector on the A500-HD/XX motherboard. This is the J2 connector which may have been removed in step 2 above. Once this has been done, reconnect the IMPACT A500 subsystem to the A500, make sure that there is no diskette in the A500's floppy drive and reboot the A500. It should now AUTOBOOT directly from the Hard Disk. No further software installation is required.

Installing the Autoboot Game Switch

Step 1: The Game switch attaches to the A500-HD/XX through the jumper labeled "J2". The connector on the switch that attaches to J2 is not directional, and can go on either way. Use the closed, or up, position on the switch for autobooting, and the open, or down, position to disable the hard drive controller.

2. Using the AUTOBOOT feature.

The IMPACT A500-HD/XX is shipped with the AUTOBOOT feature ENABLED. However, note that the AUTOBOOT feature can ONLY BE USED on an A500 system which has the V1.3. Kickstart ROM installed. This V1.3. Kickstart ROM is available from Commodore and must be installed by your dealer into the A500 motherboard.

Assuming that the A500 has the V1.3. Kickstart ROM installed, there is nothing else to do. Simply move the GAME SWITCH to the on or up position.

3 If you have an A500 which does NOT have the V1.3. Kickstart ROM installed, the AUTOBOOT EPROMS on the module must be DISABLED. This is done by removing the J2 connector from the board. This is the connector which the leads back to the GAME SWITCH. Another option on systems with the game switch installed, simply leave the switch in the down (or off) position.

NOTE: An optional AUTOBOOT/RAM expansion module can be installed inside the earlier A500-HD/XX subsystem. This module is available from GVP and allows the A500 to boot DIRECTLY off the hard disk (no floppies required) as well as allowing 2MB of FAST RAM expansion to be added to the A500. The module is available from GVP with or without the 2MB installed at the factory. To use the AUTOBOOT feature, an A500 motherboard must be upgraded with the V1.3. KICKSTART ROM, which is available from Commodore. Should you not have a 1.3 Kickstart, remove the jumper J1X to disable autobooting. You can also connect the Game Switch, if present in your unit, to jumper J1X to select autobooting. The 2MB FAST RAM expansion can be used with any version of the Kickstart ROM installed in the A500 motherboard. Simply remove jumper J3X for two megabytes installed in the module to be autoconfigured by the Amiga 500. Complete installation instructions come with the A500-2/x

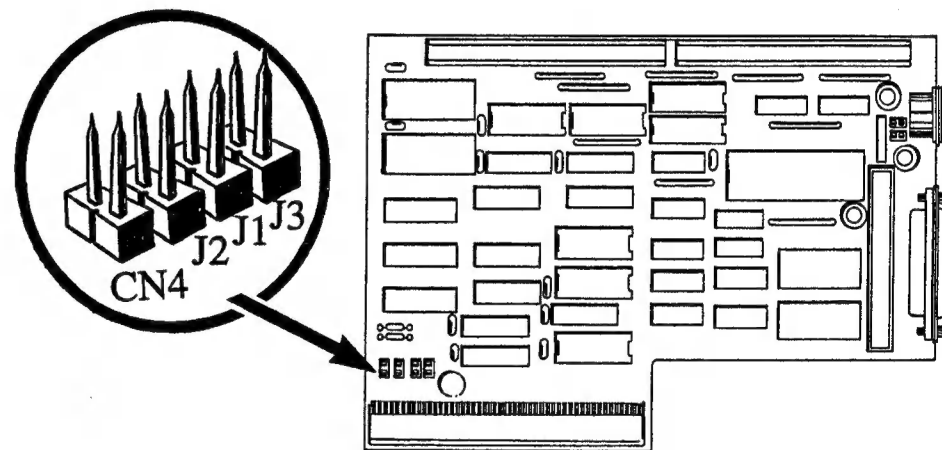


Illustration of A500 RAM addition

4. Installing Additional FAST RAM in the IMPACT A500-HD/XX SCSI/RAM Controller with 4 MB capacity

The current IMPACT A500-HD/XX board allows up to 4 MEGABYTE of zero waitstate FAST RAM to be added to the IMPACT A500-HD/XX Hard Disk subsystem.

The A500-HD/XX system is shipped from the factory installed with the V1.3 Kickstart compatible AUTOBOOT EPROMs. If your Amiga 500 does not have the 1.3 Kickstart, you must disable the EPROMs by leaving the autoboot game switch in the off position or by removing jumper J2 if no switch is provided.

The FAST RAM SIMMS, Advanced Autoboot ROMS, or jumper changes must be installed inside the IMPACT A500 unit. To do this the top cover must be removed. The following steps are the same for any modification of the Impact A500. If you do not have the tools for this, please check with your dealer before proceeding.

Removing the Cover of the Impact A500-HD/XX

Step 1: Remove the FIVE small screws holding the cover in place. There are THREE screws located on the left-hand side of the unit and TWO on the right-hand side of the case. Please use the correct size Phillips screwdriver to remove these screws ■ they can easily be damaged. When replacing the screws DO NOT OVERTIGHTEN.

WARNING

MAKE SURE YOU DISCONNECT THE POWER SUPPLY AND DISCONNECT THE UNIT FROM THE A500 BEFORE REMOVING THE TOP COVER.

Step 2: Lift the cover from the rear and tilt it forward. Do not pull the cover away from the Impact A500 since there ■ three sets of wires that run from the case to the cover.

Replacing the top cover.

Step 1: Place the cover up against the front of the Impact A500 unit. The bottom edge of the cover must fit just under the lip of the Impact A500. Slide the top cover on the IMPACT A500 unit, be certain that the back of the cover is on the outside of the back plane of the Impact A500 chassis. Use the correct size Phil-

lips screwdriver and DO NOT OVERTIGHTEN the screws (they are very tiny and can easily be stripped). Re-attach the A500 IMPACT subsystem to the A500 and reconnect the power supply.

To use the different features, the following instructions should be followed:

Installing FAST RAM on the A500-HD/XX.

When installing the FAST RAM, ■ minimum of 2MB must be installed. The type of SIMMs required are 1MB x 8 page mode DRAMs with ■ access speed of 120 nanoseconds (ns) or faster. TWO of these 1MB x 8 SIMMs are required to make up the TWO MEGABYTE capacity. These SIMMs are available from GVP or any computer dealer. If you do not purchase these SIMMs from GVP, we recommend that one of the following types of chips be used: SAMSUNG M41C1000AP-12, NEC D421000C-120 or INTEL P21010-12.

Note that there is no advantage (or disadvantage) in using higher speed DRAM chips. The FAST RAM will NOT operate faster if higher speed DRAM chips are used. As long as the DRAMs which are used are rated at 120ns or faster, the FAST RAM will operate flawlessly and at maximum, ZERO WAITSTATE, speed. We recommend STRONGLY that all the DRAMs which are used are all of the SAME speed (i.e. do NOT mix DRAMs of different speed ratings on the same board) and ■ brand. The steps required to install FAST RAM are detailed below.

WARNING:

When installing the SIMMs, make sure they are inserted correctly. The SIMM sockets should only allow the SIMMs in one way. They must be inserted facing the same way with the chips the drive and the circuit board side of the SIMM towards the drive. Inserting these chips reversed can destroy them when the board is powered on as well as damaging the SIMM sockets.

Installing two megabytes of RAM

Step 1: Remove the cover of the Impact A500 detailed in the previous section

Step 2: The SIMMs must be inserted into the two empty SIMM sockets closest to the drive of the IMPACT A500-HD/XX. It is important to install the SIMMs with the correct orientation. The SIMM must be inserted into the sockets with the chip side of the SIMM towards the drive and away from the case.

Step 3: The next step is to remove the jumper, J1 on the IMPACT A500-HD/XX. This should leave jumper J3 shorted, Jumper J2 connected to the game switch, and CN1 connected to the power LED. See the chart below for a detailed jumper settings.

Installing 4 Megabytes of RAM.

Step 1: Remove the cover of the Impact A500 detailed in the first section of this chapter.

Step 2: The SIMMs must be inserted into the empty SIMM sockets. If you already have two megabytes installed, only two sockets will be open. It is important to install the SIMMs with the correct orientation. The SIMM must be inserted into the sockets with the chip side of the SIMM towards the drive and away from the case.

Step 3: The next step is to remove the jumper, J3 on the IMPACT A500-HD/XX. This should leave jumper J1 shorted, Jumper J2 connected to the game switch, and CN1 connected to the power LED. If your system already has two megabytes installed, you can just move the jumper from J3 and place it over J1. See the chart below for detailed jumper settings.

Memory	J1	J3
0	ON	ON
2	OFF	ON
4	ON	OFF

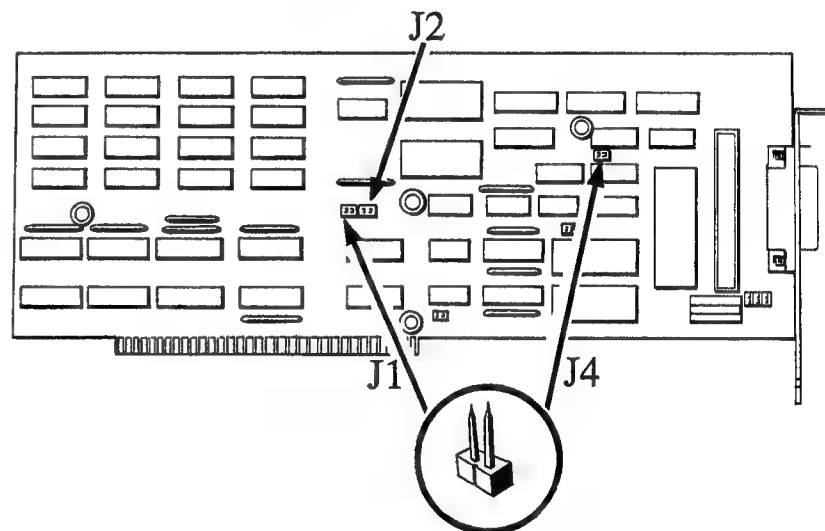
Initializing the hard disk and software installation.

This is the same for all GVP IMPACT SCSI controllers. Proceed to the chapter on "Software Installation".

5. Installing Additional FAST RAM in the IMPACT A2000-2/X SCSI/RAM Controller

The IMPACT A2000-2/X SCSI/RAM controller allows TWO MEGABYTES (2MB) of FAST RAM to be installed. This FAST RAM must be installed into the SIXTEEN DRAM sockets which are located at the top left of the board. The board accepts standard 1MB by 1 DRAMS at 120ns or faster (ie. 120ns, 100ns etc.)

The diagram below shows the layout of the IMPACT A2000-2/X controller board. Please take a moment to familiarize yourself with the main components and layout of the board as this will also be useful when reading the section on installation of the board into the A2000.



The specification for the DRAM (Dynamic Random Access Memory) chips required is:

- **Size of DRAM:** 1MB (1 MegaBit).
- **Speed:** 120ns or faster (e.g. 120ns, 100ns or 80ns).
- **Organization:** 18-pin, 1MBx1, page mode
- **Number required:** 16 chips (for 2MB).

Note that there is no advantage (or disadvantage) in using higher speed DRAM chips. The FAST RAM will NOT operate faster if higher speed DRAM chips are used. As long as the DRAMs which are used are rated at 120ns or faster, the FAST RAM will operate flawlessly and at maximum, ZERO WAITSTATE, speed. We recommend STRONGLY that

all the DRAMs which are used are all of the SAME speed (i.e. do NOT mix DRAMs of different speed ratings on the same board) and same brand. The two steps required to install 2MB of FAST RAM are detailed below.

When the IMPACT A2000-2/X is configured with ZERO FAST RAM installed (indicated by the 16 empty DRAM sockets on the board) jumpers J1 and J2 must BOTH be shorted (i.e. the small plastic jumper blocks must be installed on both J1 and J2).

Step 1: Installing the DRAM chips to provide the 2MB of FAST RAM.

Make sure you obtain the correct specification of DRAMs chips as described above.

When upgrading to 2MB of FAST RAM a total of sixteen DRAM chips are required. All the empty DRAM sockets will be used up in this case.

WARNING:

When installing the DRAM chips, make sure they are inserted correctly. They must be inserted with the "notch" or other PIN 1 orientation mark pointing towards the REAR end of the IMPACT A2000-2/X controller board. The REAR end of the board is the side which has the mounting bracket and the external SCSI connector. Inserting these chips incorrectly can destroy them when the board is powered on.

Step 2: Setting of Jumpers J1 and J2 for 2MB FAST RAM configuration.

In order for the A2000-2/X controller to pass the correct "AutoConfig" information to the A2000 AmigaDOS operating system, the jumpers J1 and J2 must be correctly installed to reflect the actual amount of FAST RAM installed on the board. The diagram in the beginning of this chapter indicates where these two jumpers are located on the board itself. Jumpers J1 and J2 must be configured as followed:

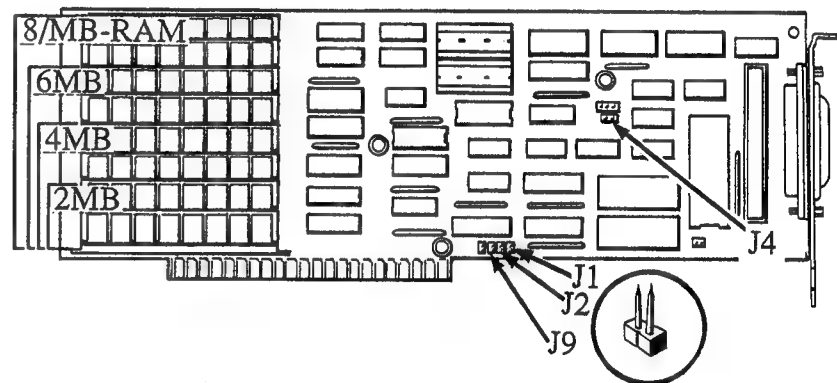
For ZERO FAST RAM, Both J1 and J2 must be installed (i.e. shorted).

When the full 2MB of FAST RAM is installed, ONLY jumper J2 must be installed (i.e. remove jumper J1).

6. Installing Additional FAST RAM in the IMPACT A2000-8/X SCSI/RAM Controller

The IMPACT A2000-8/X SCSI/RAM controller allows EIGHT MEGABYTES (8MB) of FAST RAM to be installed. This FAST RAM can be installed into the EIGHT SIMM sockets which are located on the left of the board. The board accepts standard 1MB by 8 SIMMS at 120ns or faster (i.e. 100ns, 80ns etc.)

The diagram below shows the layout of the IMPACT A2000-8/X controller board. Please take a moment to familiarize yourself with the main components and layout of the board as this will also be useful when reading the chapter on installation of this board into the A2000.



The specification for the DRAM (Dynamic Random Access Memory) chips required is:

- Size of SIMM: 1MB by 8 (1 MegaByte).
- Speed: 120ns or faster (e.g. 120ns, 100ns or 80ns).
- Organization: 8-chips per SIMM, 1MBx1, page mode
- Number required: 2, 4, 6, or 8 SIMMs (1 per 1MB).

Note that there is no advantage (or disadvantage) in using higher speed DRAM chips. The FAST RAM will NOT operate faster if higher speed DRAM chips are used. As long as the DRAMs which are used are rated at 120ns or faster, the FAST RAM will operate flawlessly and at maximum, ZERO WAITSTATE, speed. We recommend STRONGLY that all the DRAMs which are used are all of the SAME speed (i.e. do NOT mix DRAMs of different speed ratings on the same board) and same brand. The two steps to install the FAST RAM are detailed below.

When the IMPACT A2000-8/X is configured with ZERO FAST RAM installed jumper J9 must be shorted (i.e. the small plastic jumper blocks must be installed on J9). It does not matter what J1 and J2 are set for as long as J9 is shorted.

Step 1: Installing the DRAM SIMMs to provide the FAST RAM.

Make sure you obtain the correct specification of DRAMs SIMMs as described above.

When upgrading to 8MB of FAST RAM a total of eight SIMMs are required. All the empty SIMM sockets will be used up in this case.

WARNING:

When installing the SIMMs, make sure they are inserted correctly. They must be inserted with the chips facing up so that they are visible. Inserting these modules incorrectly can destroy them when the board is powered on.

Insert the SIMMs from the bottom SIMM socket up as you add memory. The bottom SIMM is on the lowest left hand side of the board as installed in the Amiga 2000. The sockets are numbered for convenience as CN3 through CN10. These labels are in white letters on the surface of the circuit board all the way in the front.

Step 2: Setting of Jumpers J1, J2 and J9 for FAST RAM configuration.

In order for the A2000-8/X controller to pass the correct "AutoConfig" information to the A2000 AmigaDOS operating system, the jumpers J1, J2 and J9 must be correctly installed to reflect the actual amount of FAST RAM installed on the board. The diagram in the beginning of this chapter indicates where these three jumpers are located on the board itself. The chart below shows in detail the jumper settings.

Memory (MB)	SIMMs	J1	J2	J9
0	none	ON	ON	ON
2	CN3-4	ON	ON	OFF
4	CN3-6	ON	OFF	OFF
6	CN3-8	OFF	OFF	OFF
8	CN3-10	OFF	ON	OFF

Special instructions for the 6 Megabyte configuration.

The six megabyte configuration requires a few extra steps to use since the board must appear to the computer as two separate RAM boards, one four and one two megabyte board. The Amiga will automatically recognize four of the six megabytes, but you have to tell the system to add the remaining two megabytes.

Step 1: Allow the system to boot up normally and show the WorkBench. Double click on the icon of your boot disk, followed by the shell icon.

Step 2: At the "1" prompt, type in, "ed s:startup-sequence" if your system starts from the hard drive, or if you use a diskette to start your system up, type in, "ed sys:gvpscripts/hdstartup-continue"

Step 3: The screen should display "ED 1.14" followed by another screen full of text. Type a single return to get a new blank line use the up arrow key from the inverted "T" pad of arrow keys to move the cursor back to the new, blank line., type in
"c:addmem 800000 9fffff".

Step 4: Hit the Esc key once to get the * prompt at the bottom of the screen. If you were able to edit the file as outlined, type the letter "x" and a return. If you were not able to get the expected screens, type the letter "q" and return to abort the changes you made and restart from the first step listed above.

As a note for the more technical users, this configuration is ideal for use with the A2088/A2286 BridgeBoards from Commodore. The Bridge Boards occupy the same space in memory as a two megabyte RAM board. Following the steps above would configure the system with the Impact board occupying four megs from 200000H-5FFFFFFH, the BridgeBoard occupying 600000H-7FFFFFFH, and the last two megabytes of the Impact board from 800000H-9FFFFFFH.

7. Installing the IMPACT A2000-2/X or the IMPACT-8/X into the A2000.

This chapter describes the hardware installation procedure for the multi-function IMPACT SCSI/RAM controllers. Both the IMPACT A2000-2/X (2MB maximum FAST RAM) and the IMPACT A2000-8/X (8MB maximum FAST RAM) are supplied complete with a flat ribbon cable for connecting to an internally mounted SCSI hard disk drive in your A2000. Should you wish to connect more than one internally mounted hard disk drive, a special "daisy-chain" ribbon cable is available from GVP as an option.

The main components of the IMPACT A2000-2/X and the IMPACT A2000-8/X controllers are illustrated in the diagrams at the beginning of the previous two chapters. Look at your controller board and identify the major components shown. You need to know some of the terminology used in the diagrams during the installation. Take note of the position of PIN 1 on the 50-pin Internal SCSI connector.

Also take note of how much FAST RAM is installed, i.e. ZERO, 2MB, or more. The FAST RAM jumpers are correctly installed in the factory. However should you need to change the amount of FAST RAM installed, see one of the previous two chapters on "Installing additional FAST RAM", to check the correct jumper setting. Additional FAST RAM may also have been installed by your GVP dealer.

WARNING:

Unplug the Amiga A2000 before removing its top cover to install the IMPACT A2000-SCSI/RAM controller and hard disk. Installing the Controller and/or the Hard Disk with the power on could cause possible injury to yourself and damage the equipment. Great Valley Products will not be responsible for any damages caused by improper installation of a hard disk or the IMPACT A2000-SCSI/RAM Controller. Such improper installation will void all warranties both on the A2000 itself and on the IMPACT A2000-SCSI/RAM controller.

Step 1: Disconnect the power cord and any peripheral cables from the back of the Amiga A2000.

All cables or other devices attached to the back of the Amiga A2000 must be disconnected. Make a note on exactly how everything was connected so that you will be able to reconnect these cables when you have completed the installation.

Step 2: Disconnect the mouse and the keyboard (and any other cables) from the front of the Amiga A2000.

Again make a note of exactly what gets connected to what so that you can reconnect it when you have completed the installation.

Step 3: Remove the five screws which hold the Amiga A2000's top cover and remove top cover.

There are two screws on each side (at the bottom of each side) of the Amiga A2000 and one screw on the back which hold the top cover in place. The screw at the back is positioned dead center at the top. Put the five screws and washers aside so that they won't get lost! Slide the cover forward but, make sure no wires are caught under the metal tab to which the center screw in the back was attached.

Step 4: If you want to install an internally mounted hard disk drive, make sure that one end of the flat ribbon cable is properly connected to the 50-pin internal SCSI connector on the IMPACT A2000-SCSI/RAM controller. Normally the flat ribbon cable is already connected when shipped from the factory, but make sure the connector is properly seated (i.e. pushed all the way in).

If you are NOT installing an internally mounted hard disk drive, remove the flat ribbon cable from the IMPACT A2000-SCSI/RAM controller board. In this case the ribbon cable will NOT be used as you will probably want to connect only external SCSI peripherals.

Step 5: The IMPACT A2000-SCSI/RAM controller can be installed in any one of the five 100-pin Amiga expansion slots. However, it should preferably be installed in the slot which is as close to the disk drives as possible so that the cable routing is simpler and cleaner (neater). Decide which slot you want to use and remove the screw at the back of the A2000 holding the blank metal bracket which covers that slot.

Note: Keep the screw as it will be used to secure the IMPACT A2000-SCSI/RAM controller.

Step 6 Check the FAST RAM jumpers, to ensure they are correctly installed. If ZERO FAST RAM is present in the IMPACT A2000-8/X, jumper J9 must be installed. In the case of the IMPACT A2000-2/0, BOTH JUMPERS J1 and J2 must be installed (for ZERO FAST RAM).

Step 7: Install the IMPACT A2000-SCSI/RAM controller in the slot you selected. Be careful to ensure that the front of the controller board slides correctly in the plastic guide attached to the inside of the front of the Amiga A2000 case. Apply slight pressure to push the controller board firmly into the slot (connector) on the Amiga A2000 motherboard. Make sure it goes all the way down and that the metal bracket connected to the rear of the IMPACT A2000-SCSI/RAM controller board correctly sits on the ledge at the back of the A2000 case.

Step 8: Using the screw that held down the blank metal bracket (from step 5 above), fasten the rear bracket of the IMPACT A2000-SCSI/RAM controller to the Amiga A2000 case.

The IMPACT A2000-SCSI/RAM controller is now installed. Now proceed with preparing your SCSI hard disk drive for installation.

8. Preparing a SCSI Hard Disk Drive for the IMPACT A2000-2/X or the IMPACT A2000-8/X.

The Amiga A2000 allows a hard disk drive with a form factor of either 3.5" half-height or 5.25" half-height, to be mounted internally. In this chapter we are assuming that you will be installing a single, internally mounted hard disk drive. For installing more than one hard disk drive, see the chapter on "Installing multiple SCSI devices".

Note that if you intend to install a Commodore "BridgeCard" (IBM PC/XT or IBM PC/AT emulator) in your A2000, you may want to keep the 5.25" peripheral bay (the larger opening below the standard 3.5" floppy drive) free for accommodating the 5.25" floppy disk drive which is normally used with those Commodore products. In that case your best choice would probably be to use a 3.5" form-factor hard disk drive which will be located next to the "DF0:" floppy disk drive.

WARNING:

Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the hard disk to any shock or other hazard during installation.

On your SCSI hard disk drive, first ensure that the correct physical SCSI ID has been set. This SCSI ID is a hardware identity number which must be set by the person installing the SCSI peripherals to make sure that each drive has been preset to a different SCSI ID. SCSI ID numbers are usually set by installing different jumpers or setting DIP switches on the SCSI peripheral itself. Most SCSI hard disks are shipped from the factory with SCSI ID = 0 (zero), so it is highly probable that no changes will need to be made to the setting.

In the case of installing a single, internally mounted hard disk, the SCSI ID must be set to zero. The installation software provided with your IMPACT A2000-SCSI/RAM controller has been specifically designed for easy installation of a single, SCSI hard disk drive. It is good practice to number the first SCSI peripheral as ID=0 and subsequent SCSI peripherals as SCSI = 1, 2, ... 6. The IMPACT A2000-SCSI/RAM controller also identifies itself with a SCSI ID to other SCSI peripherals connected as SCSI ID = 7, hence this ID number (7) may not be used by any other peripherals connected to the IMPACT A2000-SCSI/RAM controller. This SCSI ID number (7) has been preset.

Please note that some drive manufacturers (e.g. Quantum) preset their drives to SCSI ID = 6 which must be reset to zero. The system will not function correctly if this is not done.

In addition, it is necessary to ensure that the SCSI bus is properly terminated. When installing a single SCSI hard disk only, this should not be

■ problem ■ SCSI hard disks ■ normally shipped from the factory with the correct SCSI bus **TERMINATING RESISTOR PACKs** installed. When multiple SCSI peripherals are connected **ONLY** the **LAST ONE** in the chain must have these terminator resistor packs installed. As we ■ installing only one SCSI peripheral here (i.e. the hard disk drive), it is the last one in the chain and hence it **MUST** have these terminator resistor packs installed to correctly terminate the SCSI bus. These resistor packs are always located very close to the SCSI interface connector of the SCSI hard disk drive.

Step 1: Read the manual which was supplied with the SCSI Hard Disk Drive which you are going to install. Ensure that you familiarize yourself with the way to check (and set, if necessary) the SCSI ID of the drive ■ well as where the terminating resistor packs are located on the drive. Check also (in the manual) if your SCSI hard disk drive has ■ LED connector for connecting the Amiga A2000 "hard disk" LED wire. This LED is the green "Hard Disk" light located on the front panel of your A2000 (below the red "power" LED). You will need to know where this connector, on your hard disk drive, is located to power the "Hard Disk" LED on the A2000.

Step 2: Check that the SCSI ID of the hard disk drive is correctly set equal to **ZERO**. If it is not set correctly, follow the instructions in the hard disk drive manual to change it.

Step 3: Check that the **TERMINATING RESISTOR** packs on the hard disk drive are installed. If these are not installed (we are assuming that at this stage you are going to connect only a single hard disk drive), you need to install them. If you do not have these resistor packs, purchase them from the organization where you bought the hard disk drive or your local Amiga dealer.

Step 4: At this point familiarize yourself on how to connect the flat ribbon cable to the SCSI interface connector of your hard disk drive. It should not be connected yet, but it is essential that you know which way the cable must get connected to the drive. Once you have figured this out, make ■ note of it for later reference when the cable finally gets connected.

WARNING:

The ribbon cable supplied by GVP has **KEYED CONNECTORS** (i.e. they cannot be inserted incorrectly) on each end, which should match the mating **KEYED** connectors on the **IMPACT A2000-SCSI/RAM Controller** and the SCSI hard disk drive itself. However if you are using a ribbon cable which was not supplied by GVP or you have a hard disk drive which does

not have ■ keyed connector, it is essential that you ensure that the cable is correctly connected. If this is **NOT DONE** it is **POSSIBLE TO DAMAGE** the **HARD DISK** or the **CONTROLLER BOARD**. It is essential that **PIN 1** (of the 50-pin internal SCSI connector) on the **Impact A2000-SCSI/RAM controller** and **PIN 1** on the **SCSI Hard Disk drive** are connected together. **PIN 1** on the **IMPACT A2000-SCSI/RAM controller** is located on the lower side of the 50-pin internal SCSI connector (see layout diagrams in earlier two chapters) . Check in the manual which was provided with your hard disk, where **PIN 1** is located on the hard disk. On most SCSI hard disk drives, **PIN 1** is located on the side of the SCSI interface connector which is closest to the power connector of the drive. The cables supplied by GVP and most other manufacturers mark the **PIN 1** side of the cable with a color stripe or lettering. Another common method of identifying **PIN 1** is with a "V" shaped in the surface of the connector.

You are now ready to proceed with the installation of your hard disk drive into your Amiga A2000.

9. Installing an Internally Mounted Hard Disk Drive in the A2000.

This chapter describes the installation of a single, internally mounted, Hard Disk Drive into the A2000, for connection to either the IMPACT A2000-2/X or the IMPACT A2000-8/X controller boards.

WARNING:

Hard Disks are very delicate devices which can easily be damaged if not handled with great care. This is especially true during installation. Be careful not to drop or expose the hard disk to any shock or other hazard during installation. If it seems to difficult, or you get stuck, or are unsure on any detail, we suggest you get the installation done by your friendly local Amiga dealer.

Step 1: Prepare your SCSI hard disk drive and cabling as instructed in the previous chapter.

Step 2: If you have to install a 5.25" SCSI hard disk drive, go to step Step 3 below. To install a 3.5" SCSI hard disk drive, continue with this step.

Notice the metal plate to which the internal floppy disk drive (DF0:) is attached. Your 3.5" hard disk drive must be mounted on that plate to the left of the floppy disk drive. As is the case of the floppy disk, the screws which will secure the hard disk will be installed from underneath this plate. Now remove this plate by removing the four screws holding it down (two on each side).

Gently lift up the plate and position your hard disk on top of the plate. Install 4 screws from the underside of the plate (in the four mounting slots) and screw down the hard disk. We recommend that you place some spacers (e.g. washers) between the hard disk drive and the A2000 mounting plate to ensure that the components on the hard disk drive PCB do not touch the A2000 mounting plate. Before tightening the screws down, push the hard disk all the way to the back (i.e. so that the screws are moved to the back of the 4 mounting slot holes). This is necessary so that the hard disk will not protrude through the front bezel of the A2000 (as is the case with a floppy drive).

Now put the metal mounting plate (which now has both the floppy disk drive and the hard disk drive securely mounted on it) back and re-install the 4 screws which secure the plate to the A2000 sub-chassis. Don't tighten these 4 screws at this stage. Push the plate all the way forward, since you now need to make

sure that the face of the floppy disk drive is flush with the face of the A2000.

To do this, replace the A2000 cover (without installing the screws of the cover). If the floppy disk drive is not flush with the face of the machine, gently push it back until it is correctly positioned. Now remove the top cover of the A2000 once again, and tighten the screws holding the metal mounting plate.

Proceed to Step 4.

Step 3: A 5.25" hard disk drive must be installed in the slot underneath the internal floppy disk drive. The hard disk drive must be secured with four screws, two on each side. There are special slotted mounting holes located on the sides of the 5.25" mounting bay, for this purpose. Correctly align the hard disk and install the four screws.

Note that if your 5.25" hard disk has a front bezel which you want to be seen from the front of the Amiga A2000 you must also remove the plastic cover (installed inside the A2000 front panel) which covers the 5.25" peripheral bay of the A2000. You must then align the hard disk with the peripheral bay. First, before tightening the screws securing the hard disk, replace the A2000 cover. Make sure you have the hard disk positioned as you want it. Then remove the cover and tighten the mounting screws on the hard disk. Another alternative is to push the hard disk all the way back (and maybe remove its own plastic front bezel) and connect the A2000 "hard disk" LED as explained below. In this case, you would not remove the plastic cover from the A2000 front panel and the hard disk will not be visible from the front of the A2000. This is the more common installation method.

Step 4: One end of the flat ribbon cable has already been connected to the IMPACT A2000-SCSI/RAM controller board as instructed in the previous chapter. Now connect the other end of this cable to the SCSI interface connector of the hard disk drive.

WARNING:

The ribbon cable supplied by GVP has KEYED CONNECTORS (i.e. they cannot be inserted incorrectly) on each end, which should match the mating KEYED connectors on the IMPACT A2000-SCSI/RAM Controller and the SCSI hard disk drive itself. However if you are using a ribbon cable which was not supplied by GVP or you have a hard disk drive which does not have a keyed connector, it is essential to ensure that the

cable is correctly connected. Refer to the previous chapter or consult with your dealer if you are unsure.

Step 5: Connect the Amiga A2000 "Hard Disk" LED (green light on A2000 front panel). This LED will show when the hard disk drive is being accessed by the A2000. By now you will know exactly where the LED connector is located on your hard disk (see Step 1 in the previous chapter).

Look inside the A2000 case and track down the wires coming from the "Hard Disk" LED on the front panel. You will notice a 3 pin connector on the end of this cable (which should not be connected to anything). Route the wire in a neat way and connect this connector to the LED connector of your hard disk. The hard disk will only have two pins for a LED connector. Make sure that you connect the A2000 LED wire connector in such a way that the two pins with wires (one pin has no wire connected to it) match up with the two pins of the hard disk drive LED connector. The wires are color coded red and black on both the drive and Amiga LED. Match red to red and black to black, failing to do so will not damage any components, but the Hard Disk LED will not function.

NOTE: *As there are only two wires on the A2000 "Hard Disk" LED cable connector with no keying, it is possible to connect the LED connector the wrong way around (i.e. wrong polarity). This will not cause any damage BUT the LED will not work. Once you start your initial testing you will have to see if the LED works, if not, simply connect the LED cable the other way around (i.e. reverse the polarity).*

Step 6: Connect the hard disk power cable. You will notice two separate sets of wires coming out of the Amiga A2000 power supply. There should be two free power connectors (these are the large 4-pin plastic connectors), one of which can be used to provide power to your hard disk. Plug any one of these two connectors into the power connector of your hard disk. Make sure you push it all the way down so it is properly seated.

Step 7: Replace the top cover on your Amiga A2000 and re-install the five screws to hold it securely in place. Reconnect all the peripherals and then reconnect the power cord.

You have now completed the hardware installation of your IMPACT A2000-SCSI/RAM Controller and now you are ready to initialize the hard disk and start the software installation.

10. Initializing Hard Disk and Software Installation.

In order to use your hard disk in the Amiga, you need to prepare and initialize the hard disk into one or more AmigaDOS file system volume(s). To do this you will need to use the GVP Installation Diskette that is included with your IMPACT peripheral.

The GVP Installation diskette is an Amiga Workbench diskette which contains most Workbench files found on the standard Amiga Workbench. In addition this diskette contains the files needed to run and install a hard disk.

The installation procedure is very simple. Once it is started, the hard disk will automatically be formatted and initialized as one or more AmigaDOS file system volumes and the complete installation diskette will be copied to the hard disk. After that the system will actually be operating from the hard disk. If you have a Kickstart 1.2, an "HDboot" floppy disk will automatically be created. (You will need a blank 3.5" diskette for this.) Once the hard disk has been installed, the system will subsequently be booted from the hard disk. The HD Boot diskette is necessary with the Amiga V1.2. Kickstart ROM, as V1.2. does not support AUTOBOOTing off a hard disk directly (without first booting from a floppy disk).

Hard disks offer large file storage capacity. AmigaDOS allows a hard disk to be split up into different PARTITIONS. Each PARTITION is then treated as a separate AmigaDOS filesystem (just like each floppy disk is a separate AmigaDOS file system). It is good practice to split up your hard disk into more than one partition as each partition is validated and controlled separately by AmigaDOS. This means that if one partition gets corrupted (resulting in possible loss of data), the other partition(s) may still be in good condition, thus minimizing the risk of losing all data on your hard disk in one fell swoop! The GVP Installation procedure defaults to a single partition on a 20MB hard disk drive and two equal sized partitions on a 30MB and larger hard disk drives. The installation software will allow as many as eight partitions per hard disk drive.

The installation procedure will install the first partition as DH0; and the second partition as DH1; and so on. These volume/device names can then be used in the same way as DF0; etc.. Now for the hard disk installation!

If you are planning to install a Commodore A2088/A2286 BridgeBoard and use part of the GVP drive for MS-DOS, it is best to make a separate partition. The partition is formatted and treated like any other Amiga partition. See the chapter on installing the Janus software for the explanation on creating a virtual MS-DOS drive.

WARNING:

Always keep the write protect tab of your GVP Installation diskette, in the "WRITE INHIBIT" position to ensure it is not accidentally erased. Make a copy of the GVP Installation diskette for safekeeping in case the original gets damaged.

Step 1: Make sure there is no floppy disk in DF0:. Switch on your Amiga. When the "Insert Workbench" hand appears on the Amiga monitor, insert the GVP Installation Diskette.

Step 2: Wait for the Amiga to boot and for the WORKBENCH screen to be loaded. When the WORKBENCH screen appears, you will notice a single icon entitled "install.scsi". The ICON itself is identified as the "GVP install" diskette. Double click on this icon.

Step 3: Find "Install" from the number of icons appearing on the screen..

Step 4: Answer all the questions about the hardware installation. They are all very simple and self-explanatory. Be patient, it takes a while to format your hard disk and copy all the files from the installation diskette to the hard disk.

Step 5: The installation software defaults to setting up one or two partitions for you automatically depending upon the size and type of hard drive in use. If you do not wish to use the GVP defaults, answer "No" to use the default partitioning. The installation software will then ask you for the number of partitions you want and the size in megabytes you want to allocate for each. You do not need to know any information about your drive because the installation program automatically keeps track of all drive parameters and remaining space available!

The installation software allows up to eight partitions per drive. If you have only one megabyte of memory, it is suggested that you use a small number of partitions since each partition uses approximately 75K of RAM regardless of whether or not the system is booted from the hard disk.

Step 6: If you have Kickstart 1.2, place a blank diskette (or one that can be reformatted and overwritten) in DF0: when the system requests it. This diskette will then automatically be formatted and initialized as your "HD Boot" diskette (required for V1.2 Kick-

start ROM only). Make sure you also keep the write protect tab on this diskette set in the "WRITE INHIBIT" position once it is created by the installation program.

Step 7: Once the installation is completed, reboot your Amiga (Ctrl-Amiga-Amiga keys) from the hard disk. Use the HD Boot diskette inserted in DF0: if your computer still has Kickstart 1.2. This will automatically boot your Amiga and transfer control to the hard disk.

Step 8: You should now copy any files from your own workbench diskette that you need. In general these are the System and Utilities drawers, the printer drivers, the "Amiga EXTRAS" diskette, and any personal files you have created over time. The best way to do this is to use the CLI "copy" command, e.g:

1. AutoBoot the system or use the "HD Boot" diskette.
2. Double click on the "DH0" icon.
3. Double click on the "Shell" icon.
4. Insert your own workbench diskette in DF0:
5. Type: copy DF0:devs/printers DH0:devs/printers ALL

This will copy all the printer drivers from your Amiga Workbench to the hard disk.

Now "explore" your hard disk by using CLI commands like "CD", "DIR", etc. Note that the HD Boot diskette startup-sequence will automatically do all the necessary "assigns" to allow the Hard Disk to be used as the SYSTEM (SYS:) disk.

WARNING:

NEVER switch off or reboot your Amiga computer immediately after hard disk activity has occurred. Wait at least 30 seconds AFTER the last command has completed before switching off or rebooting your Amiga. The reason for this is the fact that the Amiga's AmigaDOS operating system may still be updating critical data structures on the hard disk, from its own internal buffers, even after it appears that all commands may have been completed. This AmigaDOS requirement is also the same reason why floppy disks should never be ejected before the red light goes off on the floppy disk drive, even though all commands may appear to have been completed. This is an inherent constraint caused by the multi-tasking nature of AmigaDOS.

If this WARNING is NOT adhered to, ALL DATA and files on the hard disk MAY BE LOST!! In some cases it will be necessary to reformat and re-initialize the hard disk. This is an inherent

AmigaDOS problem and is not caused by the IMPACT SCSI controller.

11. The Advanced Autoboot Software

The standard autoboot software that comes with the GVP SCSI controllers is perfectly suitable for almost all applications and standard hard drives. The Advanced Autoboot Software adds support for removable drives such as the Syquest system, Iomega Bernoulli technology, and several streaming tape drives. There is also an increase in disk transfer rates with an accelerator board present.

If you are installing the Advanced Autoboot Software on a new drive, you can follow the directions for installation of the standard software. If you already have a GVP controller and hard disk installed, you will have to either allow the installation program to reformat the hard disk or follow the procedure detailed below.

Installation of the advanced ROMS on a controller.

Step 1: Make a hard copy of the devs:mountlist file on DH0. You may need this to refer to later. You can copy this file to a blank, formatted diskette in the internal floppy drive by typing in, "copy devs:mountlist df0:" from the shell. Alternately, the file can be sent to a printer if you have one by typing in, "copy devs:mountlist prt:".

Step 2: Disconnect the power cord and any peripheral cables from the back of the Amiga A2000.

All cables or other objects attached to the back of the Amiga A2000 must be disconnected. Make a note exactly how everything was connected so that you will be able to reconnect these cables when you have completed the installation.

Disconnect the mouse and the keyboard (and any other cables connected there) from the front of the Amiga A2000.

Again make a note of exactly what gets connected to what so that you can reconnect it when you have completed the installation.

Remove the five screws which hold the Amiga A2000's top cover and remove top cover.

There are two screws at the bottom of each side of the Amiga A2000 and one screw on the back which hold the top cover in place. The screw at the back is positioned dead center at the top. Put the five screws and washers aside so that they won't get lost! Be careful in removing the top cover, make sure no wires are caught under the metal tab to which the center screw in the back was attached.

Remove the screw from the hanger at the back of the SCSI controller. Lift the SCSI controller out of the Amiga and place it in a flat, static free environment. Touch the power supply assembly of the Amiga to ground out any static you may have accumulated.

Use a chip extractor to remove the EVEN and ODD ROMs from the SCSI controller and replace them with the Advanced ROMs, EVEN for EVEN and ODD for ODD.

Replace the controller and re-assemble the computer. Boot the computer from the Advanced Installation Diskette.

Step 3: Boot the system from the Advanced Autoboot Installation Diskette. The Workbench screen will NOT show icons for your hard disks. This is normal since the standard RDB lacks some integrity checks that the advanced RDB has. You can update the RDB of the drive by using the FixPrep program on the Advanced Autoboot installation diskette. Just double click on the FixPrep icon and wait for it to complete. You can reboot (Ctrl-A-A) the Amiga to check that FixPrep has run successfully.

Preparing Syquest Cartridges

Step 1: Open the disk icon and a shell. At the "1" prompt, type in, "cd df0:gvpscripts"

Step 2: Next type in, "gvpprephd 1 FFS" or use the SCSI ID number instead of your removable drive. This will go through and generate the mountlist information for the drive with SCSI ID of 1.

Repeat the above step for each removable disk drive cartridge. For a Syquest or Bernoulli cartridge, you can not recognize the cartridge unless you have "prepped" it with the command above.

Step 3: The above steps will create a file in RAM: called mountlist. Copy this file to a separate diskette for future reference since this is the only way you have to see how the drives are set up.

Reboot your Amiga without the installation diskette in. The previously installed hard disk drives will function normally, and the new drives or cartridges will appear as "BAD", "COPY", or unintelligible characters. You can initialize the new drives or cartridges by clicking once on the icon for the removable drive and selecting Initialize from the Workbench menu.

Special instructions for the 6 Megabyte configuration.

The six megabyte configuration requires a few extra steps to use since the board must appear to the computer as two separate RAM boards, one four and one two megabyte board. The Amiga will automatically recognize four of the six megabytes, but you have to tell the system to add the remaining two megabytes.

Step 1: Allow the system to boot up normally and show the WorkBench. Double click on the icon of your boot disk, followed by the shell icon.

Using removable media.

The removable drive systems are treated like any other hard disk system in use, but require some special attention. Each cartridge used MUST be prepped with the GVPPrephD program. If a cartridge is not prepped in this manner, the drive will not be recognized at boot time.

The advanced autoboot software automatically recognizes when you change a cartridge in the drive. It does this by polling the hard disk periodically. You will see an occasional flash from the drive activity light even when you do not access the drive. This poll does not write to the drive and your data is secure. The drive does not recognize when a cartridge is removed, only when a new one is inserted

There are a few general rules for taking full advantage of the automatic diskchange function. Never eject a disk while the drive activity light is on. Do not try to click on a removed cartridge's icon. Always wait till after the icon for the newly inserted cartridge appears before clicking on a removable drive's icon.

Do not use the hardware write protection on the cartridges. The normal SCSI interface does not have a control line to indicate the cartridge is write protected like a floppy disk drive. You will be able to read from the cartridge, but writes will go to the AmigaDOS buffer and not to the drives which could lead to data loss. Instead, use the AmigaDOS LOCK command to protect the cartridge.

12. Installing Multiple SCSI Devices.

Up to seven SCSI peripherals can be attached to any of the IMPACT SCSI controllers. The main considerations to bear in mind are the following:

SCSI ID:

Each SCSI peripheral must have its own unique SCSI ID. SCSI IDs range from zero to seven. However the IMPACT SCSI Controller itself uses SCSI ID number seven. No other peripheral may therefore use a SCSI ID = 7.

Terminating Resistors:

The END of the SCSI bus MUST be correctly terminated with terminating resistors. ONLY ONE SCSI peripheral should have these terminating resistor packs installed, this should always be the last peripheral in the daisy-chain. It is ESSENTIAL that the terminator resistor packs BE REMOVED from ALL peripherals other than this last one. If there are both internal and external SCSI peripherals installed, then the external peripherals are considered to be the END of the chain. This means that the terminating resistor packs must be REMOVED from all internal SCSI peripherals installed (when one or more external peripherals are connected).

Correct mating of the RIBBON cable.

When connecting more than one internal SCSI peripheral, you need a new flat ribbon cable which has more than one connector. In this case it is essential that you take great care to ensure that the ribbon cable is correctly connected to the SCSI peripherals. The main concern here is the mating of PIN 1 from the IMPACT A2000-SCSI/RAM controller (see diagrams in earlier chapters) to PIN 1 of the SCSI interface connector on the SCSI peripheral which is being installed. THIS IS VERY IMPORTANT ■ you can damage the SCSI peripherals if the connectors are reversed.

AmigaDOS "UNIT Numbers" and SCSI ID relationships.

AmigaDOS requires mount information for each drive partition which must be mounted. In the case of hard disks, each

PARTITION(s) information is stored in ■ Rigid Disk Boot Block. This is a non file system series of data blocks at the beginning of the drive. The mountlist in the DEVS directory is not used at all for mounting the hard disk drive partitions. It is only ■ record for you to see what is written to the Rigid Disk Boot Block. One line in the boot block and the sample mountlist is the Unit number. The first mounted drive is AmigaDOS unit number one even though it is ■ SCSI ID of 0. In general the AmigaDOS unit number ■ one greater than the SCSI ID of the peripheral which is to be addressed. For example, SCSI ID = 0, requires ■ UNIT Number = 1; SCSI ID = 1, requires ■ UNIT Number = 2; etc., in the MOUNTLIST entries.

Software installation of additional hard disks.

When an additional hard disk is added, it must have a boot block written to the drive and be initialized into AmigaDOS volumes. This is done with the program called GVPPPrePHD in the gvpscripts directory on the Install.scsi disk that comes with your controller. The program will allow you to set up the hard drive with as many ■ eight partitions per drive. The program is run from the command line.

- Step 1:** Boot the system from the installation diskette and open the shell.
- Step 2:** If you have Kickstart 1.2, type in "binddrivers" and return, else skip down to the next line.
- Step 3:** Open the Shell and type, "cd df0:gvpscripts"
- Step 4:** Type, "gvpprephd # FFS UNDOs" where # is the SCSI ID of the drive to be prepped. This program will ask you if you want to use the default drive partitioning. If you answer no to the default partitioning, you will then be asked for the number of partitions and size in megabytes for each. The gvpprephd program automatically creates ■ sample mountlist in RAM disk. Copy this file to ■ separate disk since you may need to refer to it later.
- Step 5:** Use your favorite text editor like AmigaDOS ED or Microemacs to add a line to the startup-sequence in the ■ directory of DH0: that reads "sys:gvpscripts/tstgvpscsi ?". In systems with ■ Kickstart 1.2, add this line to the hdstartup-continue file

in the gvpscripts directory instead. This line will ensure that all drives are mounted, even if one is slower than another.

Step 6: Reboot your Amiga. Each of the new hard disk partitions should have an icon labeled "BAD" or "COPY". Note that the device name of the additional hard drives is two digits long. The first digit is the SCSI ID and the second is the partition number. As an example, the first partition on the SCSI ID 1 drive is called DH10; the second is DH11; and so on.

If you want to specify the parameters in the mountlist for buffers or the memory usage etc., look in the chapter for advanced users. Editing the mountlist will have no effect on the hard disk drive.

Installing your software.

Once you have installed the hard disk partitions, you will probably want to install some of the software packages you own. Follow the software publishers directions for hard disk installation. If there are not any instructions, there are a few general guidelines to follow.

It is best to create a drawer for your program by clicking once on the Empty drawer with the left mouse button and use the right mouse button to select "Duplicate" from the WorkBench menu.

Next, rename the drawer to the name of your application by selecting the icon with the left mouse button and choose Rename from the WorkBench menus.

Lastly, drag the icons from the application diskette to the drawer on the hard disk drive.

Many programs look to a specific diskette for program information. One of the Amigas powerful features is the ability to assign a diskettes identity to another location. If when you try to run your program from the hard disk, you get a requester that says, "Please insert volume XYZ: in any drive." you need to use this feature.

Simply add a line to the startup-sequence in the S directory of DH0 (or the HDstartup-continue file with Kickstart 1.2) that reads, "assign XYZ: dh0:xyz". Where XYZ is the name of the disk on the Workbench screen, and dh0:XYZ is the drawer called XYZ on DH0.

13. Hard Disks Explained

The Amiga uses a table called a mountlist to recognize the type, size, and partitioning of the drives attached to the controller. The file DEVS/MOUNTLIST contains all the information related to the number and size of hard disk partitions. This file was used by the AmigaDOS "MOUNT" command which in turn passes much of the information to the hard disk driver. With the advent of autobooting on the Amiga, a properly designed system no longer uses a text file to define the hard disk drive parameters.

In an autobooting system the mount information is stored in a special area of the hard disk called the Rigid Disk Boot Block (RDB). Each hard disk attached to the controller (or each removable cartridge drive) should have this information written to it. This way, any controller that conforms to Commodore's standards can recognize and use the drive.

It is possible for you to select parameters for the hard disk drive that differ from the ones the GVPPrepHD program selects. First, you should understand what all the entries in the mountlist, or RDB mean.

Hard disks consists of sectors, tracks and cylinders. The smallest unit is a sector. A number of sectors make up a track. If a hard disk has more than one physical read/write surface (and heads) then a cylinder contains the number of tracks equal to the number of read/write surfaces. AmigaDOS only supports sector sizes of 512 bytes on hard disk devices.

Although such parameters as "the number of sectors per track" and "number of surfaces" (= number of tracks per cylinder) are sometimes important to understand to achieve optimal performance from a hard disk, these parameters are not critical to know (for non-advanced users) in the case of SCSI hard disk drives. The reason for this is that in the case of a SCSI hard disk drive, the SCSI interface provides a view of the entire hard disk as simply "X number of blocks". Each block is a 512 byte sector. So, for example, a 20MB hard disk drive (which should have $20 \times 1,024,000 = 20,480,000$ bytes of data storage available), should consist at least of 40,000 "blocks" or sectors (i.e. $20,480,000 / 512 = 40,000$). The AmigaDOS hard disk driver (which is supplied on your GVP Installation diskette), then simply works with block numbers in that range and it has no knowledge of the actual number of tracks, sectors per track, etc.

The entries in the RDB or DEVS/MOUNTLIST file have various parameters which refer to the above concepts. In the DH0:DEVS/MOUNTLIST file generated by your GVP Installation program, we have an example mountlist entries for each hard disk partition.

WARNING:

After changing the DEVS/MOUNTLIST file it is generally necessary to re-FORMAT all the partitions on the disk affected. This will destroy all files and data in those partitions. So make backups before you start changing this file.

A typical DEVS/MOUNTLIST representation of the RDB is shown below:

```
DH1:  Device = scsidev.device
      Unit = 1
      Surfaces = 4
      BlockPerTrack = 16
      Reserved = 2
      LowCyl = 1 ; HighCyl = 611
      Buffers = 30
      BufMemType = 1
      GlobVec = -1
      DOSType = 0x444F5301
      FileSystem = 1:FastFileSystem
      MaxTransfer = 16384
```

#

NOTE: Each MOUNTLIST ENTRY must end with the character "#" on a separate line, as shown above.

The actual PARTITION SIZE generated by the above entry is calculated as follows:

$$512 \times \text{Surfaces} \times \text{BlocksPerTrack} \times (\text{HighCyl} - \text{LowCyl} + 1) \\ = 512 \times 4 \times 16 \times (611 - 1 + 1) = 20,021,248 \text{ bytes (approx 20MB).}$$

Note also that there are additional parameters which may be contained in a MOUNTLIST entry, these are optional and have no effect in the case of SCSI hard disk drives. They all default to ZERO. One such parameter is the INTERLEAVE parameter, which is totally unrelated to the real sector interleaving (a major performance factor) of a SCSI hard disk drive. Below is a description of each of the above parameters:

Device = scsidev.device

This identifies the hard disk driver to be used. This driver must be present in the EXPANSION directory of the SYS: device. This driver is unique to every hard disk controller. In the case of the IMPACT SCSI Controllers, the hard disk driver is called "scsidev". It is present in the EXPANSION drawer of the GVP Installation diskette. This driver is automatically loaded by the

"BindDrivers" command which is executed in the "S/STARTUP-SEQUENCE" script.

Unit = NN

NN is the UNIT number which identifies the physical SCSI device to which the entry applies. It must be ~~one~~ greater than the physical SCSI ID of the SCSI peripheral to which it refers.

Surfaces = NN

This should reflect the number of read/write surfaces which the hard disk has. You should find this information in your hard disk manual. Note however if this parameter is set to a different value the only effect will be that hard disk performance may be slightly affected. This parameter is much more important for non-SCSI hard disk drives. This parameter is used mainly to optimize AmigaDOS file system performance.

BlocksPerTrack = NN

NN should be set to the number of sectors per track of the hard disk. However as in the case of "Surfaces" above, it is not a critical parameter in the case of SCSI hard disk drives. It is used mainly to optimize the AmigaDOS file system performance.

Reserved = 2

This parameter must always be set to 2 for the IMPACT SCSI controllers. It reserves two blocks in the beginning of the partition. Part of these two sectors are used by AmigaDOS to identify the partition as an AmigaDOS file system "volume".

LowCyl = NN

A cylinder is defined as consisting of a number of BLOCKS (= sectors) equal to: "Surfaces x BlocksPerTrack". The LowCyl parameter defines the physical block on the hard disk where the partition will start. The MINIMUM value for this parameter is 1. To calculate the actual SCSI BLOCK NUMBER (on the hard disk) where the partition will start, the following formula can be used:

$$[(\text{LowCyl} - 1) \times \text{Surfaces} \times \text{BlockPerTrack}] + 1.$$

HighCyl = NN

This parameter defines the end of the partition and where it is physically located on the hard disk. The actual SCSI BLOCK NUMBER (on the hard disk) where the partition will end can be calculated using the following formula:

Last Block of Partition = (HighCyl x Surfaces x BlocksPerTrack)

NOTE: The value assigned to "HighCyl" MUST BE GREATER THAN OR EQUAL TO the value assigned to "LowCyl". If the two are equal the partition will consist of only a single cylinder.

When more than one partition is located on the same physical device (i.e. same UNIT number), the "LowCyl" and "HighCyl" values assigned to each partition MAY NOT OVERLAP. In the example entry shown above, a second partition on UNIT number 1, MUST have a LowCyl greater than the HighCyl value of the previous partition. In the example the LowCyl number must be greater than 612.

As an example, if we want to create a 30MB partition, from the beginning of a hard disk and the hard disk has 4 surfaces and 24 sectors/blocks per track, then LowCyl must be set = 1 and HighCyl must = 625 which is derived from: $(30 \times 1,024,000) / 512 / (4 \times 24) = 625$.

For a second partition of 10MB on the same hard disk, LowCyl = 626 (immediately following 30MB partition) and HighCyl must be set = 833 which is derived from: $625 + \{[(10 \times 1,024,000) / 512] / (4 \times 24)\} = 833$

Buffers = NN

This defines the number of buffers which the AmigaDOS file system should use as a cache. The higher this number, the better the performance, however these buffers consume memory and hence less memory is available for application programs. A good tradeoff, is a number between 20 and 30. Note also that as the number of (mounted) partitions you define increases, you may want to decrease this number, as NN buffers are reserved for each active mounted partition.

BufMemType = N

This determines the type of memory which the AmigaDOS file system should use for the buffers defined above. A value of 0

means use first available memory. Other values are 2 for use CHIP memory only and 4 for use FAST memory only.

GlobVec = -1

This feeds some information to the file system about the type of device driver used. It should always be -1 for GVP controllers.

DOSType = 0x444F5301

Tells AmigaDOS Initialize or format programs to use the Fast-FileSystem instead of the standard file system.

MaxTransfer = NNNNNNNN

Tells the file system to request no more than the number of bytes specified at one time. Larger numbers of bytes are broken down to a series of smaller requests. This number is optimized to the cache on the GVP SCSI controllers.

14. SCSI Hard Disk Error Handling and Correcting.

It is possible for hard disks to develop "bad spots" on a read/write surface. If this happens you will from time to time get a special "System Requester" window which informs you of such errors and asks you to click on "RETRY", "CONTINUE" or "ABORT", depending on the type of error. This "System Requester" window is displayed by the GVP hard disk driver.

The most serious of these types of errors are "read/write" errors. If you find that these errors start occurring regularly, it will be necessary to do a PHYSICAL format of your hard disk. Most SCSI hard disk drives contain so-called "bad block handling" firmware logic. This allows the drive to automatically re-assign any BAD blocks (where it finds a read/write error) to alternate sectors which are specially reserved for this purpose.

The AmigaDOS "FORMAT" command does NOT do a physical formatting of a hard disk drive. It only sets up the necessary data structures on a partition for the AmigaDOS file system. To do a physical format of the complete hard disk a special utility is supplied on the GVP Installation Diskette. This utility can be found in the GVPSCRIPTS directory and is called SFORMAT. SFORMAT does NOT use the entries in the MOUNTLIST file. Instead it requests a SCSI hard disk to completely reformat the entire disk. This will destroy all the files and data on the hard disk. During such a formatting operation, the SCSI firmware logic resident on the hard disk itself, will verify every sector and automatically remove any bad blocks.

After SFORMAT is executed, it will be necessary to re-install and re-initialize the software on the hard disk with the GVP Installation Diskette.

NOTE: Owners of the Advanced Autoboot Software do not have the SFORMAT program, rather they have one called GVPSCSIFormat in the GVPScripts directory of the advanced diskette. This program gives them the option of the drives own internal low level format program as SFormat does, or to use a slower, more intensive Bad Block remap. It is suggested that the bad block remap be used in place of the low level format with Quantum and removable drives.

15. PC BridgeBoard Installation

The Impact controller boards support the Commodore A2088/A2286 Bridge Boards virtual drives. The installation of these drives has caused a great deal of confusion. To further confuse the public, there are two different versions of the Janus software in use. Version 1 normally comes on one Amiga and one PC style diskette. It allows the user to use part of an Amiga drive as PC storage. Version 2 comes with the A2286 AT Bridge Board and is on one Amiga and three PC diskettes. This version has enhanced support for hard disk drives and has other features that make the PC emulation more reliable. The installation differs between the two versions, but the GVP Autoboot software installation diskette properly installs either version on DH0:. If DH0: is not your boot disk, you must use Commodore's installation procedure.

Hardware Installation

Step 1: The Bridge Boards can only go in one of two shared PC Amiga slots. If you have the A2286 Bridge Board, note that the daughter board blocks one of the Amiga slots, just to the right of the slot used. We suggest that you place your hard drive controller in a slot as close to the power supply as possible.

Step 2: You should decide before installing the drive how much space in Megabytes you want the PC side to have. Because of overhead in the virtual drive, it is suggested that you stay under 20 megabytes in the PC virtual drive, and remember that the limit of the PC DOS is 32 megabytes.

Step 3: Boot the system from the supplied GVP installation diskette. You have to decide in advance the size of your MS DOS drive and create a partition of that size. The installation program will ask you if you want to use two partitions of equal size. If you do not want partitions of this size, simply answer no to the prompt, "do you want to accept the default configuration of two drives?" The installation program will then ask you for the number of partitions you would like and the size in megabytes for each. For clarity, we suggest that you make the virtual drive on the last partition.

Installation of Janus 1.0 software

It is recommended that you allocate a separate partition for each MS-DOS virtual drive. This is not essential, but makes for a more reliable system. The partition does not require special formatting instead just use the standard GVP hard disk Install program. Read the chapter on the installation software on setting up multiple partitions. Our proce-

cedure below assumes that you have completed formatting the hard disk and you have a partition set aside for the bridge board disk.

Step 1: Boot the system from the GVP Installation diskette. Double click on the disk icon, and then the PCBridgeInstall icon. The program will automatically copy the files to your hard drive, DH0: and make a new drawer called PC.

Step 2: Reboot the system with the MS-DOS diskette in the 5.25" drive. Open the PC Color or PC Mono window, whichever you normally use. Check your BridgeBoard manual for the jumper settings to select the appropriate window.

Step 3: Always make a backup of the diskette! You can do this with a blank disk and by typing, "diskcopy a: a:" at the "A" prompt.

Step 4: You will convert the COPY of the DOS diskette in the 5.25" drive to our PC hard disk boot diskette by the following steps.

Type in, "Copy con a:\config.sys" at the "A" prompt. You will get a new line on the screen with no prompt. Type in the following lines exactly as shown except ignore the semicolon and characters to the right. They are comments provided for your information

```
files = 20           ; Max number of open files
buffers = 20         ; Memory reserved to speed drives
device = jdisk.sys   ; Load the PC to Amiga translator
device = ansi.sys    ; Load common graphics driver (optional)
^Z                  ; Tell the computer file is done
```

The ^Z stands for depress the control key (CTRL) and tap the letter Z once. You should hit a return after each line. You will not see a prompt till after the last line. You should see a line saying "Copying ## bytes."

Step 5: Reboot the bridge board by typing CTRL-ALT-DEL simultaneously. Once back at the "A" prompt, create the virtual drive by typing in,

```
"jlink d: drive:file_name /c:####"
```

Where d: is the MS DOS drive letter (C,D,E, or F),

Drive:file_name is a legal AmigaDOS drive number and file and #### is the size of the drive in KBytes.

As an example, a line to create a 20 Meg virtual drive called C: that will reside on Amiga drive DH2: and appear to AmigaDOS as a file called pcdrive is as follows.

```
jlink c: dh2:pcdrive /c:20000
```

NOTE The /c:#### flag creates the drive. Typing this a second time will erase whatever is already on the drive.

Step 6: Transfer the diskette to the new virtual drive with the MS-DOS copy command, as in "copy a:.* c:"

Step 7: Create a boot file on the diskette that will automatically restart the virtual disk and transfer control to it each time you start the BridgeBoard. Type in the following lines, but ignore the line and the semi-colon (;) since these are notations for you and not understandable to the computer.

```
Copy con a:\autoexec.bat; Send the typed text to a file on
                                                                    drive A
echo off                                                                ; Don't show every step on the screen
cls                                                                    ; Clear the screen for neatness sake
echo Put your own message here to appear at startup
jlink c: dh2:pcdrive           ; Reconnect to the virtual drive
set comspec = c:\command.com ; transfer DOS to the hard
                                                                    disk
path = c:;                                                              ; Look for commands on the hard disk
c:                                                                      ; Make the hard disk the default drive
^Z                                                                      ; End the file and save.
```

This file will automatically boot the MS-DOS operating system and transfer control to the hard disk drive.

NOTE At this point, the installation is complete, but there are some precautions that you should take. The drive is presently an AmigaDOS file that is open and in use. Should you reboot or turn off the computer at this point, the file may not close

properly. Should this occur, all data on the MS-DOS drive will be lost! You should always close the file to prevent data loss by unlinking the drive. You can do this by typing in, "jlink ■ /u" where ■ is the MS-DOS drive letter. As an added level of security, you can fill the MS-DOS drive up with data, unlink the drive, relink to the drive and delete the files. This makes the Amiga file the maximum size and leaves it at this size. An accidental reset of the computer is much less likely to loose data.

Installing the Janus 2.0 Software

- Step 1:** Reboot the computer with the GVP SCSI installation diskette and double click on the PCBrigeInstall icon. This will copy all the Janus software to your hard disk drive.
- Step 2:** Once the software installation is over, you can create the bootable virtual drive through the AmigaDOS shell. Double click on the shell icon and stretch the shell window so it covers all the screen.
- Step 3:** Type in, "info" at the prompt and look for the number of blocks free on the drive partition you plan to use for the virtual drive. This represents the total space possible for the virtual drive and the Amiga's overhead in creating the drive.
- Step 4:** Multiply the number above by 0.95 this total gives you the maximum number of blocks available on the drive. This is the number that we will use to calculate the parameters for the makeab program which was copied into the C directory of your hard disk by the installation software.
- Step 5:** Makeab requires you to choose the "physical" characteristics for the virtual drive, not the actual characteristics of your SCSI drive. Start with the maximum number of blocks available for the drive. Divide this number by either 17 or 26, if either one gives a whole number result. $X1 = \text{Max \# Blocks} / 17$ $X2 = \text{Max \# Blocks} / 26$
- Step 6:** If either X1 or X2 in the result above is a whole number, use that for the Blocks Per Track. If neither is a whole number, round the one closest to a whole number and use it for Blocks Per Track.

- Step 7:** Divide the Blocks Per Track into the maximum number of blocks and round the result down to the next whole number. You can choose the number of heads to be any value you would like, but 4 or 5 seems to work best and usually divides well into the result above. Once you divide 4 or 5 into that result and truncate to a whole number, you have the number of cylinders.

We will run through an example to help you see how the calculations work. Lets assume we want to make a 10 Megabyte PC drive on an Amiga partition.

10 Megabytes = 22223 Blocks [From AmigaDOS info command] $22223 \times 0.95 = 21111.85$ Round to 21112 [Total usable space]

The info command shows 22223 blocks are free on the drive. First take 95 percent of that number to give the Amiga some room to work which is 21112 blocks.

$21112 / 17 = 1241.88$ [product of heads and cylinders for MFM drives]
 $21112 / 26 = 812.00$ [product of heads and cylinders for RLL drives]

MFM and RLL are the two common standard drive formats used on MS-DOS compatible computers. You do not have to use these, but software compatibility is best this way.

Now take the 21112 and divide it by 17 and 26. When we divide by 26, we get the smallest number to the right of the decimal with a result of (00 is less than 88) which we round down to 812. So we have determined to use 26 blocks per track.

$812 / 2 = 406$ [divide product by the number of heads with cylinders resulting]

Select the number of heads, for example 2. We see that 2 is about the smallest number that divides evenly into 812 with a result of 406. You can also select 4 for the number of heads since it divides in evenly as well. Remember, it is best when the number of heads you choose to use divides evenly into the previous result. We can then use 2 heads and 406 for the number of cylinders. The virtual drive will appear to the Bridge Board as an RLL type hard drive with 2 heads and 406 cylinders and 26 blocks per track. The 17 and 26 numbers for blocks per track are not required, but suggested for best compatibility with software.

The MakeAB program can be run directly from the shell by typing in MakeAB and the drive and file name that will be the virtual drive. As an example, we will make the DH1: drive as the PC drive and we will call the virtual drive, "pcboot" so we can recognize what it is later.

- Step 1:** Type in, "MakeAB dh1:pcboot" at the shell prompt and feed the numbers in you calculated for Heads, Blocks per track, and Cylinders when prompted by the program.

The worst case would be an error in calculations that results in a requester for the drive being full. If this occurs, click on the cancel gadget and rerun the makeab with a smaller number of cylinders.

Step 2: Once the virtual drive is created, you have to tell the Amiga which file and drive to use. First create a text file called Aboot.ctrl. Probably the easiest way to do this is with the Amiga text editor called ED, but you can use any editor that produces ASCII output. We will continue with our example using DH1:pcboot as the virtual drive.

Type in "ed sys:pc/system/about.ctrl" at the shell prompt. This will give you a blank screen and a line saying, "Creating a new file." Now type in the drive and file name, like "dh1:pcboot:" and a single carriage return. Please note that you do not type the quotation marks, they are only added for clarity.

Step 3: To exit and save what you have entered, type the Escape key and the letter x and return. If you feel that you have made an error, or are uncertain, type Escape, q and return and this will not save the file to disk. This leaves you free to correct the error before saving the file.

Step 4: The last step is to make running the virtual drive automatic and requires you to modify the startup sequence in the S directory. This modification is especially important if you did not use the GVP installation software. Again, you can use the ed program or any other text editor. The changes that have to be made are often in place. First make sure the line that reads, "binddrivers" is present. This line takes the Janus software and loads it into memory so the Amiga can access the PC side. If this line is not present, you will have to add it in, near the top in most cases, near the bottom if a Commodore A2620 or a GVP 68030 is installed.

Step 5: The line that must be added for the bootable disk to work should be immediately after the binddrivers line and read,

"run nil: sys:pc/pcdisk".

This program allows the bridge board to read and write Amiga drive information. You can also run the Amouse software and the Timeservices program for the A2088 in the same way. Once these changes are made, just place the MS-DOS system disk 1 in the 5.25" drive and reboot the computer for them to take effect.

STEP 6: Open the appropriate color or mono window for the PC and you should have an "A" prompt showing. At the prompt, type FDISK and return. This will give you a menu of choices. Take the number 1 choice to create a drive partition and use the default of all the drive for the DOS partition. Next, use the number 1 choice to select an active partition as the number one partition. Use the Escape key to exit and reboot. Some versions of the A2088 bridge board will hang here and you will need to use the PCHard icon to reset it.

Step 7: Once you get back to the "A" prompt, you will have to format the drive by typing,

"format c: /s".

This will also install the boot files on the drive. Now type in,

"xcopy a: c: /s"

to copy the first system disk over. Next type in, "C:" to get a "C" prompt. Place the second 5.25" diskette in the drive and type, "xcopy a: c: /s" again. Place the third diskette in the drive, hit the F3 key and this will transfer this last diskette to the virtual hard drive. You have successfully completed the installation!

16. Trouble Shooting and Reporting

You can expect years of trouble free service from your GVP SCSI RAM controller. Should you experience a problem, try these tests first.

ERROR	TEST or CHECKS
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SYSTEM DOES NOT AUTOBOOT	Check the autoboot jumper or game switch to make sure it is in the closed position.
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SYSTEM DOES NOT WARM BOOT	Is "MOUNT RAD:" in the startup-sequence? If so, remove it or add Boot-Pri = -127 to the mountlist entry for RAD:
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CAN NOT OPEN SCSIDEV.DEVICE	Boot the system from the install disk. Open a shell and type in, "cd df0:gvpdscrip" and "gvpprephd 0 UNPREP UNDO". Reboot the system and re-run the installation program.
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CANNOT ACCESS HDD SCSI ID = 0	Check the drive SCSI ID and the cabling to the drive and controller.
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WRITE OF PB ##### FAILED	The drive has bad blocks. Run the SFORMAT program (Standard) or the GVPSCSIFORMAT (advanced)
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If the problems you encounter do not match any of these, you may want to call GVP Engineering Services for assistance. You can speed the time this takes by preparing some information in advance. Use the guide on the next page when either writing or calling GVP with questions.

Amiga 2000 Motherboard revision:

Boards Installed:

Video slot

CPU slot

Zorro Slot 1

Zorro Slot 2

Zorro Slot 3

Zorro Slot 4

Zorro Slot 5

Enhanced Chip Set?

GVP Boards:

SCSI board type and revision number:

Number and types of drives attached:

The numbers from all chips with paper labels:

Date of purchase:

Dealer purchased from:

Please record as accurately as possible any error message reported by the installation software. These messages are the most usefull in diagnosing any problem with your system. Should a repair or replacement be necessary, you must call first for a return authorization number (RMA) before sending anything. The shipping/receiving department will refuse any unit without a return number prominently displayed on the box. You should also save the original carton and packing material in case you need to return the unit to us or your dealer. If you suspect some type of software compatibility, (i.e. a program will not run with the hard disk installed) please report this to BOTH GVP and the software publisher. Please detail the steps that you did so we can duplicate your problem and correct it.

Remember to send in your warranty card!

17. TECHNICAL SPECIFICATIONS.

Specifications:

- Combination 1MB, zero-waitstate, FAST RAM controller and ANSI X3T9.2 compatible SCSI controller.
- Supports up to 7 SCSI peripherals.
- High performance DMA data transfer to/from hard disk.
- SCSI data transfer rate up to 2MBytes/sec for asynchronous SCSI peripherals.
- SCSI data transfer rate up to 4MBytes/sec for synchronous SCSI peripherals.
- Amiga A500/A2000 expansion bus host interface.
- Auto-configs both FAST RAM and SCSI Controller.
- Sockets for AUTOBOOT hard disk driver in ROM/EPROM (can only be used with Amiga V1.3, or later, Kickstart ROM). 16-bit wide data path allowing hard disk driver to be directly executed out of these ROM/EPROMs.
- Internal 50-pin SCSI connector.
- External 25-pin (DB25) SCSI connector. Macintosh compatible pinout.
- Power requirements: +5 Volts $\pm 5\%$, 2.2 Amps maximum.
- Ambient temperature: 0° – 55° C
- Relative Humidity: 20% - 80%

Internal SCSI Connector Pinout.

PIN #	Name
50	I/O
48	REQ
46	C/D
44	SEL
42	MSG
40	RST
38	ACK
36	BSY
34	Ground
32	ATN
30	Ground
28	Ground
26	Not Used
24	Ground
22	Ground
20	Ground
18	DB(P)
16	DB(7)
14	DB(6)
12	DB(5)
10	DB(4)
8	DB(3)
6	DB(2)
4	DB(1)
2	DB(0)

All odd pins, except pin 25, are ground. Pin 25 is not used.

External SCSI Connector Pinout (DB-25 Female)

Pin	Name	Pin	Name
1	REQ	14	Ground
2	MSG	15	C/D
3	I/O	16	Ground
4	RST	17	ATN
5	ACK	18	Ground
6	BSY	19	SEL
7	Ground	20	DB(P)
8	DB(0)	21	DB(1)
9	Ground	22	DB(2)
10	DB(3)	23	DB(4)
11	DB(5)	24	Ground
12	DB(6)	25	TPWR
13	DB(7)		